REMARKS

The present application was filed on July 30, 2001 with claims 1-38. In the outstanding Office Action, the Examiner: (i) rejected claims 1, 7-9, 15, 19, 25-27, 33, 37 and 38 under 35 U.S.C. §103(a) as being unpatentable over B. Kitts et al., "Cross-Sell: A Fast Promotion-Tunable Customer-Item Recommendation Method Based on Conditionally Independent Probabilities" (hereinafter "Kitts"); and (ii) acknowledged allowable subject matter in claims 2-6, 10-14, 16-18, 20-24, 28-32 and 34-36.

Applicants appreciate the acknowledgment of allowable subject matter in claims 2-6, 10-14, 16-18, 20-24, 28-32 and 34-36. Applicants have rewritten claims 2, 5, 10, 16, 20, 23, 28 and 34 in independent form incorporating all limitations of respective base claims. Claims 3-6 depend from claim 2, claims 11-14 depend from claim 10, claims 17 and 18 depend from claim 16, claims 21-24 depend from claim 20, claims 29-32 depend from claim 28, and claims 35 and 36 depend 34. Also, dependent claims 7, 8, 15, 25, 26 and 33 have been amended to now depend from one of the above-mentioned rewritten independent claims.

Accordingly, Applicants assert that claims 2-8, 10-15, 16-18, 20-26 and 28-36 are now in condition for allowance.

Regarding the §103(a) rejection of independent claims 1, 9, 19, 27, 37 and 38, although Applicants believe that said claims as originally filed were patentable over Kitts, Applicants have nonetheless amended said claims to further clarify the claimed invention in a sincere effort to move the case through to issuance.

More particularly, claim 1 has been amended (as shown below in underline) to recite: identifying sets of items in the input data set as mutual dependence patterns based on respective comparisons of conditional probability values associated with each of the sets of items to a predetermined mutual dependence threshold value; and outputting the identified mutual dependence patterns based on results of the comparisons. Claims 19 and 37 have been amended to include similar limitations. Further, claim 9 has been amended (as shown below in underline) to recite: obtaining an input data set of items; searching the input data set of items to identify sets of items in the input data set as mutual dependence patterns based on respective comparisons of conditional

probability values associated with each of the sets of items to a predetermined <u>mutual dependence</u> threshold value; and outputting the identified <u>mutual dependence</u> patterns based on results of the comparisons. Claims 27 and 38 have been amended to include similar limitations.

Kitt discloses a "conditional independence." From page 438, section 3, of Kitts, it is clear that such conditional independence is a <u>one way</u> (pair-wise) relationship, i.e., Kitt looks only at the probability of b given a, c, d, e, ... or n. However, as expressly stated at the top of the right hand column of page 438 of Kitts: "[t]he disadvantage of this constraint is that accuracy can be lower because we are ignoring interactions."

On the other hand, the claimed invention is directed toward <u>mutual dependence</u> and thus is able to consider interactions, e.g., more than just a one way relationship. As illustratively explained in the present specification, at page 7, line 22, through page 8, line 5:

> Intuitively, an <u>m-pattern [mutual dependence pattern]</u> captures a set of items that often occur together. In other words, if a part of an m-pattern occurs, it is likely, to a high probability, that the other part of the m-pattern will be seen. This can be formally defined as follow:
>
> A set of items $E = \{i_1, i_2, ..., i_k\}$ is said to be an m-pattern with a minimum mutual dependence threshold *minp*, if and, preferably, only if the conditional probability $p(E1|E2)$ is above a minimum <u>mutual dependence</u> threshold *minp*, where $0\ minp\ 1$, for any non-empty two subsets $E1$ and $E2$ of E.
>
> The <u>conditional probability can be estimated by</u> $p(E1|E2) = count(E1+E2)/count(E2)$, where $p(x)$ is the occurrence probability of x, and $count(x)$ represents the number of occurrences of x in the data.

Thus, Kitts is completely silent to <u>mutual dependence</u> patterns and a <u>mutual dependence</u> threshold value. This is why Kitts is called a "recommendation method based on conditionally <u>independent</u> probabilities" (see title of Kitts).

Further, as is clear from the disclosure of Kitts, Kitts is concerned only with customer recommendations and not with pattern discovery. This is why Kitts does not disclose "outputting the identified mutual dependence patterns based on results of the comparisons," as in the claimed invention.

The Office Action acknowledges that Kitts does not disclose this limitation, however, the Office Action suggests that it would be obvious to modify Kitts to do so. Applicants strongly disagree.
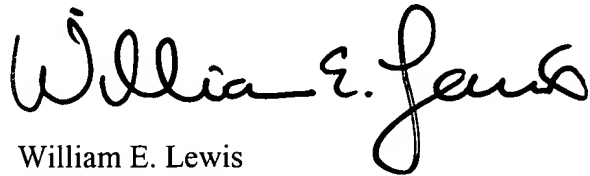
The Federal Circuit has stated that when patentability turns on the question of obviousness, the obviousness determination "must be based on objective evidence of record" and that "this precedent has been reinforced in myriad decisions, and cannot be dispensed with." <u>In re Lee</u>, 277 F.3d 1338, 1343 (Fed. Cir. 2002). Moreover, the Federal Circuit has stated that "conclusory statements" by an examiner fail to adequately address the factual question of motivation, which is material to patentability and cannot be resolved "on subjective belief and unknown authority." <u>Id</u>. at 1343-1344.

In the Office Action at pages 3 and 4, the Examiner provides the following statement to prove motivation to modify Kitts, with emphasis supplied: "[i]t would have been obvious to one of ordinary skill in the art . . . to modify the system of Kitts, <u>wherein the imputation and collaborative filtering, provided . . . would incorporate the use of outputting the one or more identified patterns based on result of the comparison, in the same conventional manner as disclosed by Kitts . . . and [to] provide improvements . . . where both large and have a very low chance of being caused by random</u>."

Applicants submit that this statement is based on the type of "subjective belief and unknown authority" that the Federal Circuit has indicated provides insufficient support for an obviousness rejection. More specifically, the Examiner fails to identify any objective evidence of record which supports the proposed combination. Also, it is not completely clear what this statement actually means in the context of the disclosure of Kitts.

In view of the above, Applicants believe that claims 1-38 are in condition for allowance, and respectfully request withdrawal of the §103(a) rejection.

Respectfully submitted,

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William E. Lewis
Attorney for Applicant(s)
Reg. No. 39,274
Ryan, Mason & Lewis, LLP
90 Forest Avenue
Locust Valley, NY 11560
(516) 759-2946

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